

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
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## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

REC'D 29 NOV 2005  
 PCT 611A

|  |   |   |  |
|--|---|---|--|
| Applicant's or agent's file reference<br>0815-044244   |   | Date of mailing (day/month/year) <b>23 NOV 2005</b><br><b>FOR FURTHER ACTION</b><br>See paragraph 2 below |  |
| International application No.<br>PCT/US04/19596  | International filing date (day/month/year)<br>18 June 2004 (18.06.2004) | Priority date (day/month/year)<br>20 June 2003 (20.06.2003)   |  |
| International Patent Classification (IPC) or both national classification and IPC<br>IPC(7): F16J 15/40, 15/447; F01D 11/00, 11/02 and US Cl.: 277/409, 411-415; 415/171.1, 173.5, 174.5 |   |   |  |
| Applicant<br>ELLIOTT COMPANY   |   |   |  |

1. This opinion contains indications relating to the following items:

- ☒ Box No. I      Basis of the opinion
- ☐ Box No. II      Priority
- ☐ Box No. III      Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV      Lack of unity of invention
- ☒ Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI      Certain documents cited
- ☐ Box No. VII      Certain defects in the international application
- ☐ Box No. VIII      Certain observations on the international application

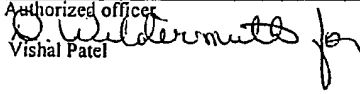
### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

|  |  |
|--|--|
| Name and mailing address of the ISA/ US<br>Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230 | Authorized officer<br><br>Vishal Patel<br>Telephone No. 571-272-7060 |
|--|--|

Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US04/19596

Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing  
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format  
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US04/19596

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

|                               |                    |     |
|-------------------------------|--------------------|-----|
| Novelty (N)                   | Claims <u>NONE</u> | YES |
|                               | Claims <u>1-8</u>  | NO  |
| Inventive step (IS)           | Claims <u>NONE</u> | YES |
|                               | Claims <u>1-8</u>  | NO  |
| Industrial applicability (IA) | Claims <u>1-8</u>  | YES |
|                               | Claims <u>NONE</u> | NO  |

2. Citations and explanations:

Claims 1-8 are novelty under PCT Article 33(2) as being anticipated by Hagi et al (US. 5,967,746).

Hagi teaches an apparatus for restricting axial leakage flow along a rotating shaft and providing necessary damping to improve rotor stability comprising an abradable labyrinth seal (portion of 2 that gets abraded by teeth 5) and a damper seal adjacent thereto (portion of 2 that does not get abraded by teeth 5).

The abradable labyrinth is upstream of the damper seal (the damper seal near d2 which does not get abraded and the abradable seal adjacent to the first tooth on the left hand of figure 1). There is a plurality of labyrinth and damper seal segments adjacent and interleaved along the shaft (each damper seal opposite a smooth surface between the teeth 5 and each labyrinth seal formed by abrading the material of 2 by teeth 5).

The abradable seal segments comprises a plurality of annular teeth (5) extending from the shaft and an abradable stator section radially outward of the teeth (each section of 2 that is abraded by 5). The damping means is a honeycomb (portion of 2 that is opposite of a smooth section between teeth 5).